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INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

10/533533

Applicant's or agent's file reference 20/W32633WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/GB 03/04630	International filing date (day/month/year) 28.10.2003	Priority date (day/month/year) 31.10.2002
International Patent Classification (IPC), or both national classification and IPC G01J5/34		
Applicant SHIMADZU RESEARCH LABORATORY (EUROPE) LTD et al.		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 8 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 1 sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the opinion</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>		
Date of submission of the demand 13.05.2004	Date of completion of this report 19.11.2004	
Name and mailing address of the International preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Jacquin, J Telephone No. +49 89 2399-8040 	

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/GB 03/04630**

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-10 as originally filed

Claims, Numbers

3-33 as originally filed

1, 2 received on 14.10.2004 with letter of 14.10.2004

Drawings, Sheets

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB 03/04630

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application,

☒ claims Nos. 33

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (specify):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 33 are so unclear that no meaningful opinion could be formed (*specify*):

see separate sheet

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos.

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

☐ the written form has not been furnished or does not comply with the Standard.

☐ the computer readable form has not been furnished or does not comply with the Standard.

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-32
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-32
Industrial applicability (IA)	Yes: Claims	1-32
	No: Claims	

2. Citations and explanations

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB 03/04630

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB 03/04630

Prior Art

Reference is made to the following documents:

D1: US4595832
D2: US4792682
D3: EP259992
D4: US4379971

Section III

Because of a severe lack of clarity (see paragraph 1- a) below), claim 33 cannot be examined with respect to novelty and/or inventive step.

Section V

1- Objections as to lack of clarity (Art. 6 PCT)

a) Since independent claim 33 does not contain any technical features, it does not meet the requirement following from Article 6 PCT taken in combination with Rule 6.3(b) PCT that any independent claim must contain all the technical features essential to the definition of the invention. For the purpose of this examination, it has been understood as referring for example to a device according to claim 1.

b) The expression "high frequency" used in claim 10 is vague and unclear and leaves the reader in doubt as to the meaning of the technical features to which it refers, thereby rendering the definition of the subject-matter of said claim unclear (Article 6 PCT).

2- Objections as to lack of inventive step (Art. 33(3) PCT)

The present application does not meet the requirements of Article 33(3) PCT, because the subject-matter of claims 1 to 32 does not involve an inventive step. The reasons are the following:

2- 1. Independent claim 1

Document D1 discloses a device for simultaneously reflecting and detecting electromagnetic radiation, comprising

- a first layer made from electrically conductive material (D1: fig. 3, element 42, and col. 3, l. 52-53) for simultaneously reflecting and absorbing electromagnetic radiation incident at a surface of the layer, wherein said first layer simultaneously separates incident electromagnetic radiation into a reflected part (in D1, element 42 is a metal and always reflects part of the incoming beam) and an unreflected part (D1: element 42 is a partial absorber, so it never reflects all the radiation), the first layer being effective to reflect the electromagnetic radiation of said reflected part away from the device (D1: col. 5, l. 31-35) and to absorb the electromagnetic radiation of the unreflected part (D1: col. 3, l. 52-53),
- a second layer underlying said first layer, made from a material having an electrical property dependent on an intensity of electromagnetic radiation absorbed by said first layer (D1: fig. 3, element 24 is a pyroelectric detector (col. 3, l. 54) or a bolometer (col. 4, l. 12)),
- a third layer underlying said second layer, made from electrically conductive material (D1: element 36 of figure 4, which is the face-type version of the detector represented on figure 3, having electrodes 34 and 36 perpendicular to incident radiation, see col. 4, l. 46-55), wherein a first electrode and a second electrode measure an electrical voltage and/or current responsive to said electrical property and indicative of the intensity of the absorbed electromagnetic radiation.

The subject-matter of claim 1 differs from the disclosed apparatus in that the first layer forms itself the first electrode. In D1, electrode 34 is represented (fig. 4) as a layer distinct from partial absorber layer 42 (the double layer 38 consists in layers 40 and 42 in figure 3 which are not represented in figure 4). The problem to be solved can be construed as simplifying the available apparatus by reducing the number of layers.

However, it is part of the common technical knowledge that any given layer can be used as an electrode (meaning that it can be inserted in an electrical circuit) as soon as it possesses electrical conductivity. In the configuration represented on figure 4 (D1), the use of metal layer 42 as an electrode in order to eliminate layer 34 is an obvious constructional change which comes within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can readily be foreseen. Consequently, the subject-matter of claim 1 also lacks an inventive step.

The applicant should note that a metallic layer and/or a partial absorber (for example layer 42 in figure 3 of D1) always absorbs part of the radiation impinging on it and always reflects another part of this radiation. The choice of the metal used for layer 42 determines the proportions of reflected and absorbed light. The adjunction of a "modifier" layer (40 in D1) just provides an additional tuning possibility for reaching the desired proportions of reflected and absorbed light. This modifier layer is not always included in the devices disclosed in D1 (col. 4, l. 41-45).

2- 2. Dependent claims 2 to 32

Claims 2, 3 : These properties of the reflective surface are obvious alternatives.

Claims 4 to 8 : The feature of an additional layer partially transmissive to electromagnetic radiation and having filtering and/or protective properties is known from D1 (fig. 3 and 4, element 40 ; col. 3, l. 62 - col. 4, l. 2 and col. 4, l. 26-28 for multilayer arrangements).

Claims 9, 18, 20 : When a layer is applied onto another layer having a fixed shape given to it by an underlying substrate, it conforms to the shape of that layer.

Claim 10 : This is implicit in all pyrometric or bolometric detectors, since otherwise these devices would not function.

Claims 11 to 13 : These features are a matter of usual practice in the art (see for example D1 : col. 6, l. 18-20 and D2 : col. 5, l. 8-29).

Claims 14 to 16 : These features are commonly present in this type of detectors, see for example D2 (col. 3, l. 14-29).

Claims 17, 18, 20, 22, 23, 24, 25 : The subject-matter of these claims is trivial, see D3 (fig. 5, and col. 9, l. 20-25) for the case of a flat substrate. For a non-planar substrate, see claim 19 below.

Claims 19, 21 : The subject-matter of claim 1 implies that the first layer acts as a mirror surface for a part of the incoming radiation. It is an obvious option for the skilled person to design the surface of this first layer for the purpose of shaping (collimate, focus...) the reflected beam as desired, in accordance with the intended use for the reflected beam. Considering the usual manufacturing process of these detectors, the chosen shape is necessarily imposed by the shape of the underlying rigid substrate.

Claims 26, 27 : This is well known in the art, see for example D4 (col. 4, l. 37-49).

Claim 28 : These metals belong to the usual choices for light-transmissive electrodes, see D2 (col. 2, l. 59-62).

Claim 29 : The useful wavelength range depends on the reflectivity characteristic of the first metal electrode, which is adapted according to the needs of the user.

Claim 30 : These are usual thicknesses for the layers, see D2 (col. 2, l. 60).

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB 03/04630

Claim 31 : In D1 (figure 4) and D2 (figure 2B), the detected voltages or currents are measured between the upper and lower electrodes, along a direction parallel to the incoming light. They represent a number of local voltages or currents, which are measurable individually, depending on the structure of the electrodes. For the purpose of increasing spatial resolution of the pyroelectric detector, it would be obvious to the skilled person to provide a segmentation of the lower electrode, in order to detect the local voltages.

Claim 32 : In D2, two upper electrodes 7 and 8 are provided, having a common lower electrode 9.